Spring 4-13-2020

Vu Villa Staircase Structural Repair

Kevin Bingham
Montana Tech of the University of Montana

Tyler Lindbloom
Montana Tech of the University of Montana

Kaden Sukut
Montana Tech of the University of Montana

Tanner Laws
Montana Tech of the University of Montana

Cody Baszler
Montana Tech of the University of Montana

See next page for additional authors

Authors

Kevin Bingham, Tyler Lindbloom, Kaden Sukut, Tanner Laws, Cody Baszler, Alec Steele, Eli Brewer, Kolby Sukut, and Derek Bruner

MontanaTech

Vu Villa Staircase Structural Repair

Team Members:

Kevin Bingham, Tyler Lindbloom, Kaden Sukut, Tanner Laws, Cody Baszler, Alec Steele, Eli Brewer, Derek

Advisor: Kolby Sukut

Background

The Vu Villa in uptown Butte has a staircase leading to the second floor that are beginning to sag and need structural support to fix the sag in the stairs.

Option 1—Beam

Using the LRFD method of wood design, the loading conditions were determined. Using the ultimate load, the beam size was determined, being a **3 1/2" x 11 7/8" 24F-V4 DF/DF Glulam Beam**. The connections needed were designed using Simpson Strong-Tie connections. The connections being used are **MBHU 3.56/11.88KT and CCQ74SDS2.5**.

Beam Construction:

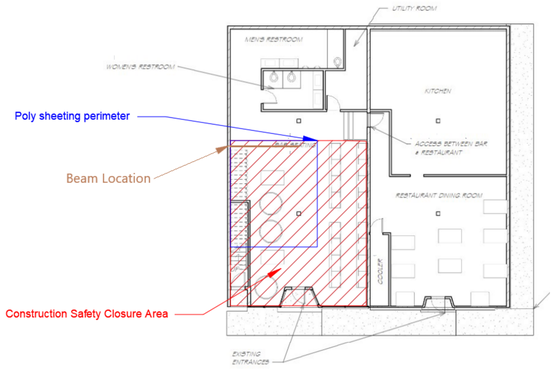
Material & Supplies = $432

Labor = $2,317

(18.75 hrs over two days)

Equipment = $4,741

Total Cost = $7,490



Positive Aspects of Option 1:

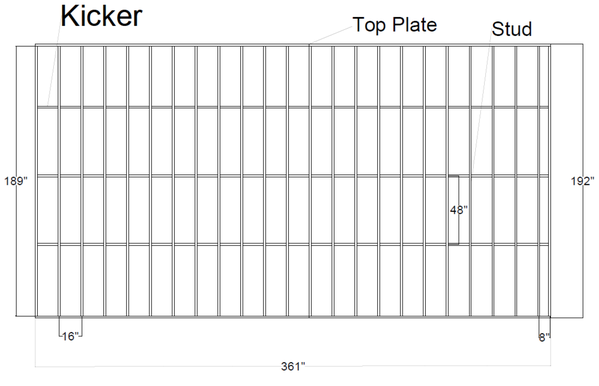
Less invasive

Lower bid cost

Shorter construction duration

Option 2– Wall

- 2x6 Hem-Fir Used for Studs, Top Plate, Kickers, and Bottom Plate
- 16 " O.C. stud spacing
- 16' Height, 32'1" Length
- Use 10d nails
- All connection will be toe-nailed
- Wall connects to Staircase Stringer



Wall Construction:

Material & Supplies = $3306.50

Labor = $6,168.14

(8 DAYS)

Equipment = $1,117.95

Total Cost = $13,876.16

Positive Aspects of Option 2:

Creates New Storage Area

Improves Visual Appearance

Maximizes Floor Space Use